## REMARKS

The Office Action of January 26, 2006, has been reviewed and the Examiner's comments carefully considered. Claims 1-14, 16-21, 25, 26, 31-35, 37, 39-53, and 55-60 are pending in the application. Claims 15, 22-24, 27-30, 36, 38, 54, and 61-64 have been canceled. Claims 7, 8, 16-21, 31-35, 37, 39, 46, 47, and 55-60 have been withdrawn from consideration by the Examiner. Claims 1-6, 9-14, 25, 26, 40-45 and 48-53 have been amended. Applicants expressly reserve the right to file divisional applications on the subject matter of the withdrawn claims. The pending claims have been amended to more clearly distinguish the present invention over the prior art of record.

The amendments to the claims are supported in the original claims and in the specification at page 32, lines 10-13, where examples of optical articles are disclosed, and page 33, lines 23-24, where it is made clear that the optical articles of the present invention include both photochromic and non-photochromic embodiments. No new matter has been added and Applicants submit that these amendments place all of the claims in condition for allowance.

The Examiner notes that the listing of references in the specification is not a proper Information Disclosure Statement. It is not intended to be. The various references listed throughout the specification are not considered to be relevant to the present invention other than to direct the reader to specific examples of materials, preparation methods, etc., that may be used in the present invention.

## Restriction Requirement

The Examiner indicated in a communication dated October 11, 2005, that claims 1-64 are subject to a restriction requirement. Specifically, the Examiner asserted that the application contains claims directed to the following patentably distinct species of the claimed invention: I) ethylenically unsaturated monomers/polymer, II) polyol(allyl carbonate) monomers/polymer, III) thiol monomers/polymer, IV) polycyanate monomers/polymer, V) polyepoxide monomers/polymer, and VI) polyurethane monomers/polymer. The Examiner further asserted that the application contains claims directed to the following patentably distinct species (of nanoparticle) of the claimed invention: 1) oxides/mixed oxides, 2)

metals or alloys, 3) S or sulfides, 4) carbides, 5) tellurides, 6) selenides, 7) nitrides, 8) diamond, and 9) surface modifying chemical.

Applicants thank the Examiner for indicating that the inventions of the various species are patentably distinct from each other, and concur with the Examiner's determination of patentable distinctness among the species. Applicants affirm the election of polyol (allyl carbonate) and oxides/mixed oxides made in the reply filed on November 7, 2005.

## Rejections

Claims 1-6, 9-15, 22-30, 36, 38, 40-45, 48-54, and 61-64 were rejected under 35 U.S.C. §103(a) as being obvious over Selvig et al. (US 5,236,978). The Examiner asserts that the reference discloses polymerizable organic resin compositions of from about 70 to 90 percent by weight polyol (allyl carbonate) and about 30 to 70 percent by weight aliphatic polyurethane having terminal allylic unsaturation. Polymerizates that are prepared from such compositions may be used to prepare photochromic articles, e. g., lenses. The Examiner points out that the reference teaches that the polymerizate should be transparent or optically clear, and also teaches the incorporation of photochromic pigments or nanoparticle-sized photochromic compounds encased in metal oxides.

The Examiner concedes that the reference fails to explicitly disclose the claimed RI range of 1.595 to 1.695, but asserts that the skilled artisan would have to utilize only routine experimentation to arrive at such values.

Applicants respectfully disagree with the Examiner's rejection and conclusions regarding claims 1-6, 9-15, 22-30, 36, 38, 40-45, 48-54, and 61-64 in view of the present amendment. The present invention is drawn to a non-photochromic optical article such as plano lenses, ophthalmic lenses, sun lenses, windows, automotive transparencies, and aircraft transparencies. The optical article is formed from a polymerizable composition comprising a polymerizable polyol(allyl carbonate) monomer component and a nanoparticle material. When at least partially cured, the composition has a refractive index of from 1.595 to 1.695.

Selvig et al. discloses resin compositions of polyol (allyl carbonate) and allyl terminated polyurethane that may be used to prepare photochromic articles. The only nanoparticles disclosed by the reference are encapsulated photochromic

compounds. The Selvig et al. reference does not teach or suggest the present invention, i. e., a *non-photochromic* optical article formed from a polymerizable composition comprising a polymerizable polyol(allyl carbonate) monomer component and a nanoparticle material. The nanoparticles used in the articles of the present invention serve to enhance the refractive index of the resulting polymerizate when the polyol (allyl carbonate) is polymerized, without detrimentally affecting other physical properties. There is no teaching or suggestion anywhere in the Selvig et al. reference to use a polyol (allyl carbonate) monomer in combination with a nanoparticle to produce a non-photochromic optical article as recited in the present claims. Moreover, contrary to the Examiner's assertion that the skilled artisan would have to utilize only routine experimentation to arrive at an RI range of 1.595 to 1.695, Applicants point out that polyol(allyl carbonate) such as poly(diethylene glycol) bis(allyl carbonate) has a refractive index of only about 1.50 (see specification at page 1, lines 15-16), and is brought into the range of 1.595 to 1.695 (as recited in the present claims) by the addition of nanoparticles to the composition, which is neither taught nor suggested by the Selvig et al. reference.

There is additionally no teaching or suggestion in the Selvig et al. reference that the nanoparticle used in the article of the present invention has an average particle size of from 5 to 100 nm (claims 3 and 42), that the nanoparticle has a refractive index greater than 1.7 (claims 4 and 43), that the nanoparticle has a refractive index greater than that of the polymerizable monomer (claims 5 and 44), that the nanoparticles comprise any of the surface modifying chemicals recited in claims 9-13, 26, and 48-52, that the nanoparticle is present in the composition in an amount of 0.5 percent by weight to no greater than 50 percent by weight (claims 15 and 53), that the article has at least 50% transparency in a range of wavelengths of from 400 to 700 nm (claim 25), or that the composition has a density of no greater than 1.8 grams/cm$^3$ (claims 40-45 and 48-53). Reconsideration and withdrawal of the rejection is respectfully requested.

Claims 1-6, 9-15, 22-28, 36, 40-45, 48-54, 61, 62, and 64 were rejected under 35 U.S.C. §102(b), or in the alternative, under 35 U. S. C. §103(a) as being unpatentable over Schmidt et al. (US 5,910,522). The Examiner asserts that the reference discloses a composite adhesive for optical and opto-electronic applications

and contains the following: a) transparent polymers and/or polymerizable oligomers and/or monomers such as polycarbonates suitable for use as adhesive, b) 1-50 percent by volume nanoscale inorganic particles such as metal oxides, c) optionally, compounds for surface modification of the inorganic particles, and d) optionally, a crosslinking initiator. The adhesive composition has a refractive index of from 1.3 to 1.7. The Examiner concludes that the reference discloses the claimed materials and RI values with enough specificity to constitute anticipation. The Examiner further asserts that any minor modifications necessary to meet the claims such as a particular carbonate resin or surface functionalizing agent are well within the purview of the skilled artisan.

Applicants respectfully disagree with the Examiner's rejection and conclusions regarding claims 1-6, 9-15, 22-28, 36, 40-45, 48-54, 61, 62, and 64 in view of the present amendment. The Schmidt et al. reference teaches adhesive compositions used to connect optical materials such as fiber optics. The adhesives of Schmidt et al. comprise nanoscale inorganic particles and may contain polymerizable monomers suitable for use as an adhesive. The Schmidt et al. reference does not teach or suggest the present invention, i. e., a non-photochromic optical article selected from the group consisting of plano lenses, ophthalmic lenses, sun lenses, windows, automotive transparencies, and aircraft transparencies, formed from a polymerizable composition comprising a polymerizable polyol(allyl carbonate) monomer component and a nanoparticle material. When at least partially cured, the composition has a refractive index of from 1.595 to 1.695. There is further no teaching or suggestion in the reference that the adhesives disclosed therein may be used to prepare the optical articles of the present invention.

There is additionally no teaching or suggestion in the Schmidt et al. reference that the nanoparticle used in the article of the present invention has a refractive index greater than that of the polymerizable monomer (claims 5 and 44), that the nanoparticles comprise any of the surface modifying chemicals recited in claims 12, 13, and 50-52, that the article has at least 50% transparency in a range of wavelengths of from 400 to 700 nm (claim 25), or that the composition has a density of no greater than 1.8 grams/cm$^3$ (claims 40-45 and 48-53). Reconsideration and withdrawal of the rejection is respectfully requested.

Claims 1-6, 9-15, 22-28, 36, 40-45, 48-54, 61, 62, and 64 were rejected under 35 U.S.C. §102(b), or in the alternative, under 35 U. S. C. §103(a) as being unpatentable over Arney et al. (US 6,432,526). The Examiner asserts that the reference discloses metal oxide particles capable of being highly dispersed in organic materials to form transparent colloids and ceramers. The metal oxide particles have surfaces attached to dispersing aids and have particle diameters of about 4 nm to less than 20 nm. The oxide particles are used to increase the refractive indices of transparent organic matrices to greater than about 1.6. The Examiner further asserts that the size and amount of nanoparticles overlaps with the ranges instantly claimed. The Examiner concludes that the reference specifically or inherently anticipates each of the claimed limitations. The Examiner further asserts that any minor modifications necessary to meet the claims such as a particular carbonate resin or surface functionalizing agent are well within the purview of the skilled artisan.

Applicants respectfully disagree with the Examiner's rejection and conclusions regarding claims 1-6, 9-15, 22-28, 36, 40-45, 48-54, 61, 62, and 64 in view of the present amendment. The Arney et al. reference teaches metal oxide particles that may be combined with organic polymer precursors to form transparent ceramers having a refractive index greater than 1.6. The Arney et al. reference does not teach or suggest the present invention, i. e., a non-photochromic optical article selected from the group consisting of plano lenses, ophthalmic lenses, sun lenses, windows, automotive transparencies, and aircraft transparencies, formed from a polymerizable composition comprising a polymerizable polyol(allyl carbonate) monomer component and a nanoparticle material. When at least partially cured, the composition has a refractive index of from 1.595 to 1.695. The only polymer precursors taught by Arney et al. as suitable for use in preparing the ceramers are ethylenically unsaturated monomers such as olefins, styrenes, vinyl ethers, vinyl esters, allyl ethers, allyl esters, acrylates, methacrylates, acrylonitriles, methacrylonitriles, azalactones, N-vinyl carbazole, and N-vinyl pyrrolidone. Aziridine monomers are also disclosed (see Arney et al., col. 9, lines 34-42.) All of the ethylenically unsaturated monomers taught by the Arney et al. reference are of the species I) ethylenically unsaturated monomers/polymer, as outlined in the communication (i. e., Restriction Requirement) from the Examiner dated October 11, 2005. Polyol(allyl

carbonate) monomers/polymers as recited in the present claims have already been determined by the Examiner to be patentably distinct from; i. e., non-obvious in view of, the separate species of ethylenically unsaturated monomers/polymers taught by Arney et al. Aziridine monomers as taught by Arney et al. are cyclic amines and are in no way related to or suggestive of polyol (allyl carbonate) monomers. Regarding the Examiner's assertion that any minor modifications necessary to meet the claims such as a particular carbonate resin or surface functionalizing agent are well within the purview of the skilled artisan, such an assertion is invalid in view of the Examiner's prior holding of patentable distinctness between species. Therefore, Arney et al. does not teach or suggest the use of polyol (allyl carbonate) in optical articles as recited in the present claims.

There is additionally no teaching or suggestion in the Arney et al. reference that the nanoparticle used in the article of the present invention has a refractive index greater than 1.7 (claims 4 and 43), that the nanoparticles comprise any of the surface modifying chemicals recited in claims 12, 13, and 50-52, that the article has at least 50% transparency in a range of wavelengths of from 400 to 700 nm (claim 25), or that the composition has a density of no greater than 1.8 grams/$cm^3$ (claims 40-45 and 48-53). Reconsideration and withdrawal of the rejection is respectfully requested.

Claims 29, 30, and 63 were rejected under 35 U.S.C. §103(a) as being unpatentable over Arney et al. (US 6,432,526) in view of Kumar (US 6,353,102). Applicants submit that the rejection is moot in view of the cancellation of the claims in question.

## Conclusion

It is believed that Applicants' claims are patentable over the prior art. None of the references, taken alone or in any combination, teach or suggest the optical articles recited in the present claims.

Therefore, reconsideration and withdrawal of the rejection of the claims is respectfully requested. The Examiner is invited to contact Applicants' representative, undersigned below, with any questions.

Respectfully submitted,

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